



**SERIES PVIF
AWWA C517 FULL PORT
ECCENTRIC PLUG VALVES
3"-72"**



Series PVIF

Full Port Plug Valves
to AWWA C517



IMPLEMENTATIONS

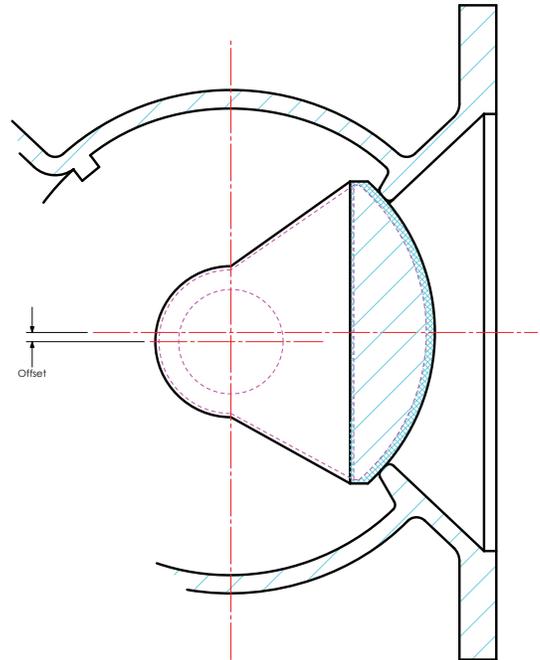
The Eccentric Plug valve is the industry standard for systems that will experience sludge or large particulate flow. VSI Eccentric Plug Valves are able to achieve an extremely high port area while keeping the operating time much lower than the traditional gate valve.

ECCENTRIC MOVEMENT

The most essential function of a valve is that it must isolate line flow. This action is easy to accomplish, but with traditional designs as pressure and size increase the torque required to close the valve increase exponentially.

To counteract this characteristic all VSI Eccentric Plug Valves incorporate an offset in the valve design. By offsetting the plug and shaft centerline from the valve body and pipe centerline a cam action is achieved. This action allows the plug to contact the valve body only in the last 5-10 degrees of movement. Through the rest of the valve motion the only torque transmitted to the operator will be from the low friction bearings and line force on the plug.

The cam action increases the seat force without increasing operator torque allowing for the use of more durable encapsulation materials that are often harder.



RESILIENT PLUG FACING

All VSI Eccentric Plug Valves are equipped as standard with a fully encapsulated resilient plug. By fully encapsulating the plug the service life of the valve is greatly extended by reducing corrosion of the plug. The resilient nature of the seat allows for driptight shut off. Should small solids become deposited upon the plug face, tight shut off is still guaranteed.

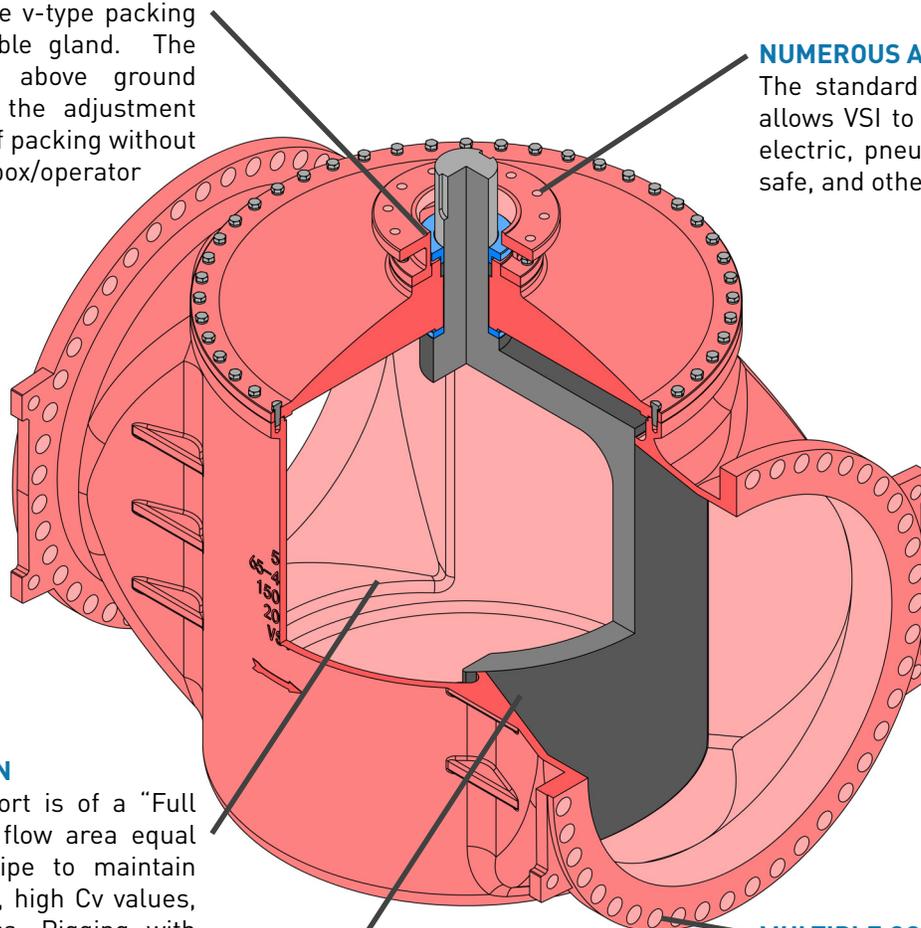


ADJUSTABLE/REPLACEABLE PACKING

The packing of the Series PVIF consists of multiple v-type packing rings and adjustable gland. The open bonnet on above ground valves allows for the adjustment and replacement of packing without removing the gearbox/operator

NUMEROUS ACTUATION OPTIONS

The standard ISO 5211 top mount allows VSI to offer a wide range of electric, pneumatic, hydraulic, fail-safe, and other actuation packages



FULL PORT DESIGN

The rectangular port is of a "Full Port" type with a flow area equal to the nominal pipe to maintain excellent free flow, high Cv values, and low head loss. Pigging with semi-rigid foam type pigs is possible.

MULTIPLE COATING OPTIONS

The standard 2-part heavy duty coating can be optioned to a wide variety of coatings as required by the project requirements such as NSF 61 listed coatings, ceramic reinforced resin, glass or rubber lining, or coal-tar epoxy

FULLY ENCAPSULATED PLUG

The plug of the Series PVIF is fully encapsulated with resilient rubber covering every surface exposed to the line. Full encapsulation eliminates corrosion and minimizes the possibility of delamination or damage to the seat.



SAMPLE SPECIFICATION

1. **Full Rectangular Port Plug Valves for Waterworks Service**

- 1.1. This specification covers the design, manufacture, and testing of eccentric plug valves from 2 inch (50 mm) through 72 inch (1800 mm) under service pressure of up to 175 psig (1200 kPa).
- 1.2. Plug valves shall be resilient seated and of the quarter turn, non-lubricated, eccentric type.

2. **GOVERNING STANDARDS**

- 2.1. All eccentric plug valves shall be in full conformance with the design, manufacturing, and testing standards set forth by the American Water Works Association (AWWA) in Standard ANSI/AWWA C517.
- 2.2. When requested, manufacturer shall provide an Affidavit of Proof of Design Testing in accordance with AWWA C517.

3. **CONNECTIONS**

- 3.1. Flanged valves shall conform to all standards of ANSI B16.1, Class 125.
- 3.2. Mechanical joint valves shall conform to all standards of ANSI/AWWA C111/A21.11.

4. **MARKINGS**

- 4.1. Each valve shall be marked with the manufacturer's name, valve size, body material, and pressure rating cast into the body of the valve. Lettering shall be a minimum of 1/2 inch tall and project 1/10 inch from body.
- 4.2. All plug valves, except buried or submerged valves, shall be equipped with a type 304 or 316 stainless steel tag identifying body, plug, resilient seat, and stem material in addition to manufacturer's name, pressure rating, size, date of manufacturer, and date of testing.

5. **DESIGN**

- 5.1. Port areas of valves in relation to pipe areas shall not be less than 100%
- 5.2. Valves shall be equipped with a minimum 95% nickel seat directly bonded to a machined finished surface on valve body. Plated or removable seats are not acceptable.
- 5.3. Valve shall be equipped with a set of V-type stem packing with an adjustable gland. Valve stem packing shall be replaceable without removing the cover or bonnet of the valve.
- 5.4. Radial shaft bushings shall be supplied in the upper and lower bearing journals. Thrust bearings shall be supplied between the plug and body in both the upper and lower journal areas.
- 5.5. The valves shall be equipped with a mounting area for operators conforming to Manufacturers Standard Society(MMS) 101 or International Organization of Standardization(ISO) 52111. There shall be sufficient clearance to directly mount standardized operators with easily accessible fasteners.

6. **MATERIALS**

- 6.1. The valve body, cover, and bonnet if equipped shall be constructed of ASTM A536 Ductile Iron.
- 6.2. The plug shall be constructed of ASTM A536 Ductile Iron and shall be one piece. The resilient plug encapsulation shall conform to ASTM D429 testing.
- 6.3. Radial and thrust bearings shall be made of permanently lubricated RTFE or Bronze.
- 6.4. All submerged coatings shall conform to AWWA C550, be holiday free, and have a minimum total dry film thickness of 10 mils.
- 6.5. All uncovered, submerged, or buried valves shall have type 304 or 316 stainless steel hardware. All others shall have zinc plated carbon steel hardware unless specified.

7. **OPERATORS**

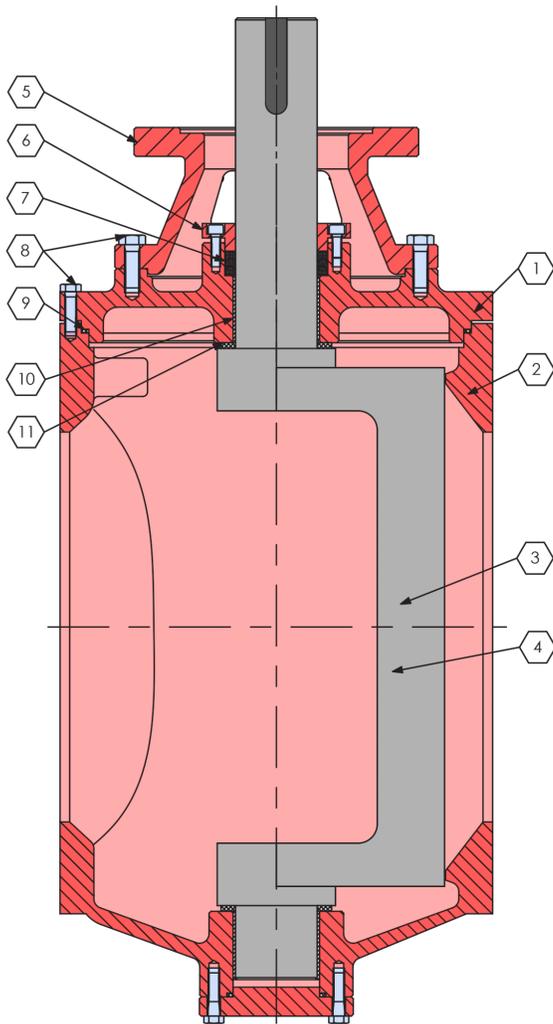
- 7.1. All manually operated valves 4 inch and larger shall be equipped with a worm gear actuator with position indicator.
- 7.2. All actuators shall be permanently sealed and suitable for buried service.
- 7.3. All 2 inch square operating nuts, exposed hardware and shafts shall be made of corrosion resistant stainless steel.
- 7.4. All actuators equipped with handwheels shall have a maximum rim pull of 50lbs.

8. **MANUFACTURER**

- 8.1. Eccentric plug valves shall be VSI Series AWWAC517 as manufactured by Valve Solutions, Inc., Alpharetta, GA USA or approved equal.
- 8.2. All valves shall be warranted by manufacturer for a minimum of 12 months.



Materials of Construction



Item	Description	Materials Available	Standard
1	Cover	Same as Body	
		Ductile Iron*	ASTM A536 65-45-12
		Cast Iron	ASTM A126 Class B
2	Body	Stainless Steel 304	ASTM A351 CF8
		Stainless Steel 316	ASTM A351 CF8M
		Ductile Iron*	ASTM A536 65-45-12
3	Plug	Cast Iron	ASTM A126 Class B
		Stainless Steel 304	ASTM A351 CF8
		Stainless Steel 316	ASTM A351 CF8M
4	Plug Encapsulation	Buna-N (NBR)*	
		Chloroprene	
		EPDM	
5	Bonnet ⁽¹⁾	Same as Body	
		Stainless 304*	ASTM F593/594
		Stainless 316	ASTM F593/594
6	Gland	Same as Body	
		Plated Steel	ASTM A325 Type 1
		Bronze	C651
7	Packing	Same as Plug Encapsulaton	
		Stainless 304*	ASTM F593/594
		Stainless 316	ASTM F593/594
8	Exterior Hardware	Plated Steel	ASTM A325 Type 1
		Bronze	C651
		Stainless 304	
9	Cover Seal	Same as Plug Encapsulation	
		SS316 Reinforced PTFE*	
		Stainless 304	
10	Bearings	Stainless 316	
		Bronze	
		Nylon	
11	Grit Gard	Nylon	
12	Packing Gland	Same as Body	
NL	Lower Cover ⁽²⁾	Same as Body	
NS	Coating/Lining	Two-Part Epoxy*	
		Fusion Bonded Epoxy, Black	
		Glass Lining	
NS	Tag	Coal-Tar Epoxy	
		Aluminum*	
		Stainless Steel	
NS	Assembly Lubricant	ANSI/NSF 61 Listed Silicone Lubricant	
NS	Operator	Varies	

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Additional material options available as special order.

*Standard Material

(1) Bonnet and Cover are one piece on 3"-10"

(2) Lower cover integral to body casting on 3"-10"



Design Standards

Size Range	3"-72" Flanged End 3"-48" MJ End
Construction	AWWA C517* ASME B16.34
Coatings	AWWA C550* ANSI/NSF 61 Compliant*
Connections	ANSI B16.1 Class 125/ANSI B16.5 Class 150* ANSI B16.1 Class 250/ANSI B16.5 Class 300 ANSI/AWWA C111/A21.11 (MJ)*
Lay Length	AWWA C517* (ex. MJ)
Bonnet	ISO 5211* MSS SP-101

*Standard Option



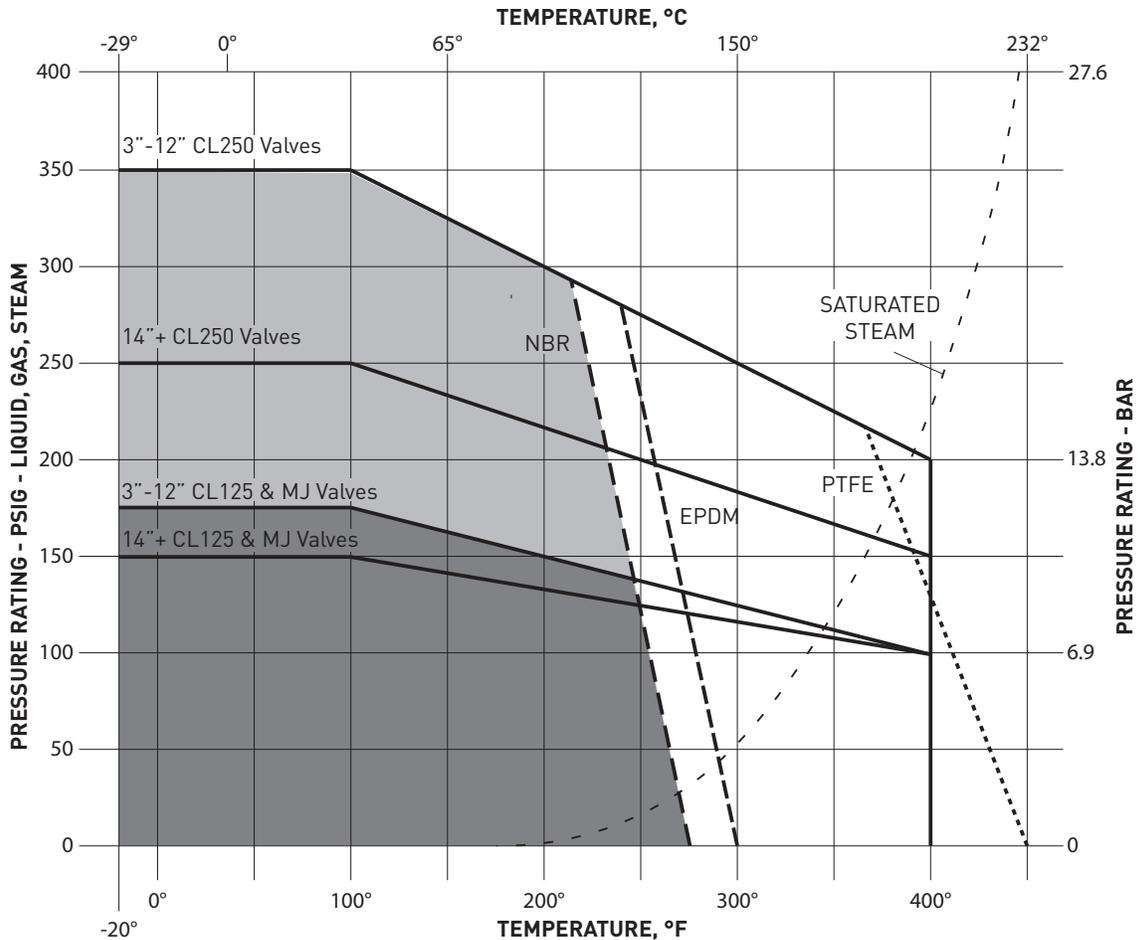
American Water Works
Association

Resistance Guide

Designation	Common Names	Composition	Min/Max Temperature Range	General Properties	Resistant to:	Attacked by:
NBR	NBR, Buna-N	Nitrile-butadiene	-30F/225F	Excellent resistance to petroleum-based fluids. Good physical properties	Many hydrocarbons, fats, oils, greases, hydraulic fluids, chemicals	Ozone, ketones, esters, aldehydes, chlorinated and nitro hydrocarbons
FPM	FPM, Viton®	Hexafluoropropylene-vinylidene fluoride	-10F/400F	Excellent oil and air resistances both at low and high temperatures. Very good chemical resistance	All aliphatic, aromatic, and halogenated hydrocarbons, acids, animal and vegetable oils	Ketones, low molecular weight esters and nitro containing compounds
PTFE	PTFE, Teflon®	Polytetrafluoro-ethylene	-100F/450F	Excellent abrasion resistance and chemically inert	Acids, harsh inorganic and organic chemicals, oils, oxidizing agents, and solvents	Molten alkali metals and fluorine at high temperatures
EPDM	EPDM, EPM	Ethylene-propylene-diene Monomer	-40F/250F	Excellent ozone, chemical, and aging resistance. Poor resistance to petroleum-based fluids	Animal and vegetable oils, ozone, strong and oxidizing chemicals.	Mineral oils and solvents, aromatic hydrocarbons



Pressure/Temperature Ratings



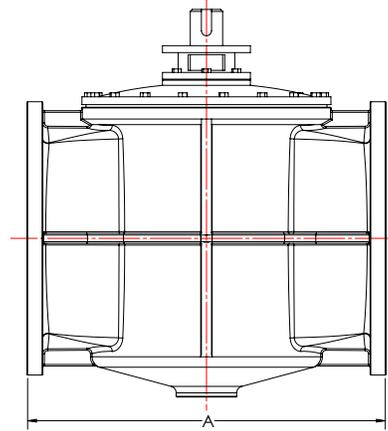
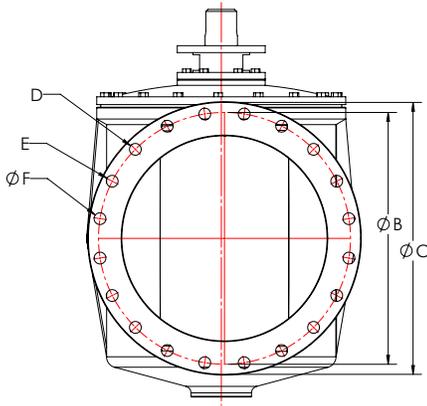
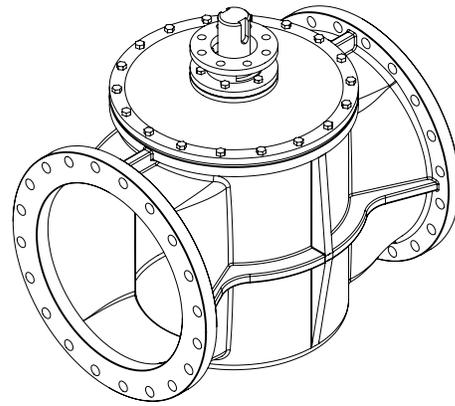
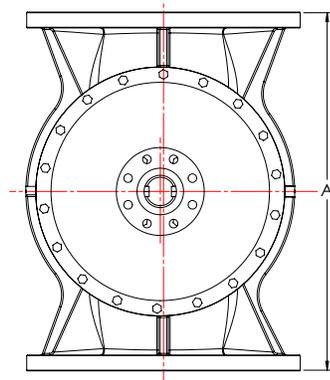
In determining field pressure ratings for Series PVIF Plug Valves that are constructed of Ductile Iron the above chart should be used. Pressure cast on valve represents maximum seating pressure; maximum hydrostatic pressure is temperature dependent, and may be higher than nominal pressure rating.

Cold Working Pressure Rating

SIZE	FORWARD CLOSEOFF W/GEAR	REVERSE CLOSEOFF W/GEAR	FORWARD CLOSEOFF NUT AND/OR LEVER	REVERSE CLOSEOFF NUT AND/OR LEVER
3"-12" CL125	175 PSI	175 PSI	175 PSI	50 PSI
3"-12" MJ	175 PSI	175 PSI	175 PSI	50 PSI
14"+ CL125	150 PSI	150 PSI	NA	NA
14"+ MJ	150 PSI	150 PSI	NA	NA
3"-12" CL250	350 PSI	250 PSI	NA	NA
14"+ CL250	250 PSI	150 PSI	NA	NA



FLANGED CL125 BARESTEM DIMENSIONS



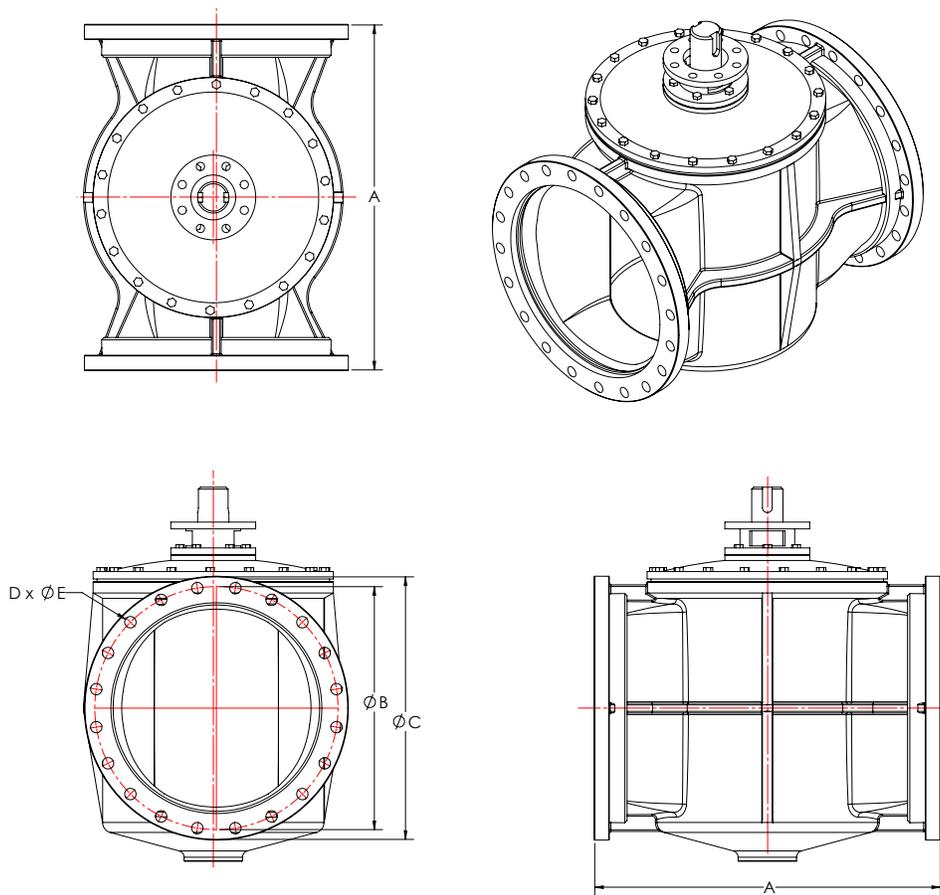
SIZE	A	B	C	D ⁽¹⁾	E ⁽²⁾	F ⁽³⁾
3"	8.00	6.00		4	5/8"-11UNC	0.75
4"	9.00	7.50	9.0	8	5/8"-11UNC	0.75
6"	10.50	9.50	11.0	8	3/4"-10UNC	0.88
8"	11.50	11.75	13.5	8	3/4"-10UNC	0.88
10"	13.00	14.25	16.0	12	7/8"-9UNC	1.00
12"	14.00	17.00	19.0	12	7/8"-9UNC	1.00
14"	17.00	18.75	21.0	12	1"-8UNC	1.13
16"	17.75	21.25	23.5	16	1"-8UNC	1.13
18"	21.50	22.75	25.0	16	1 1/8"-7UNC	1.25
20"	23.50	25.00	27.5	20	1 1/8"-7UNC	1.25
24"	42.00	29.50	32.0	20	1 1/4"-7UNC	1.38
30"	51.00	36.00	38.8	28	1 1/4"-7UNC	1.40
36"	60.00	42.75	46.0	32	1 1/2"-6UNC	1.61
42"	72.00	49.50	53.0	36	1 1/2"-6UNC	1.61
48"	84.00	56.00	59.5	44	1 1/2"-6UNC	1.61

(1) "D" represents the total number of tapped and through holes, per flange

(2) "E" represents the size of tapped holes and bolts used for flange

(3) "F" represents the size of through holes

MECHANICAL JOINT BARESTEM DIMENSIONS



SIZE	A	B	C	D ⁽¹⁾	E ⁽²⁾
3"		6.19	7.6	4	0.75
4"	14.49	7.50	9.1	4	0.88
6"	15.75	9.50	11.1	6	0.88
8"	17.38	11.75	13.3	6	0.88
10"	19.38	14.00	15.6	8	0.88
12"	20.75	16.25	17.9	8	0.88
14"	24.50	18.75	20.3	10	0.88
16"	27.25	21.00	22.5	12	0.88
18"	29.25	23.25	24.8	12	0.88
20"	31.00	25.50	27.0	14	0.88
24"	42.00	30.00	31.5	16	0.88
30"	51.00	36.88	39.1	20	1.13
36"	60.00	43.75	46.0	24	1.13
42"	70.00	50.62	53.1	28	1.38
48"	84.00	57.50	60.0	32	1.38

(1) "D" represents the total number through holes, per flange

(2) "F" represents the size of through holes, bolt size is 1/8" smaller

- Flange's drilling/bolting and bell end/gasket groove dimensions per AWWA C111

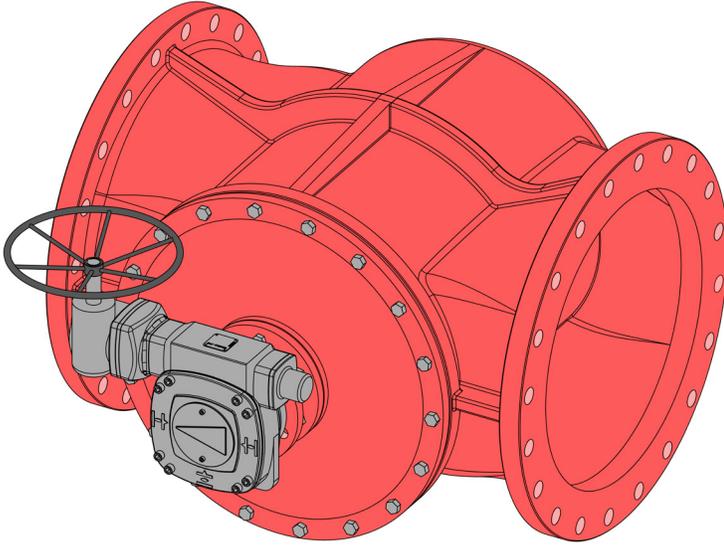
Series PVIF

Full Port Plug Valves
to AWWA C517

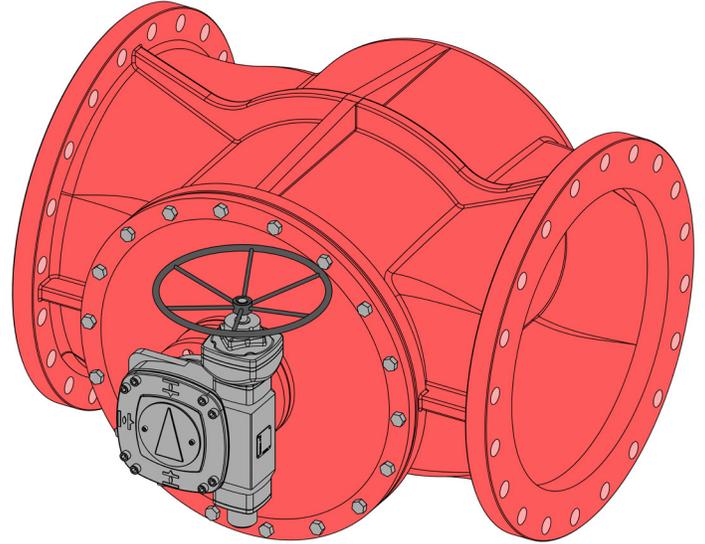


STANDARD OPERATOR TYPES

2-STAGE WORM GEAR

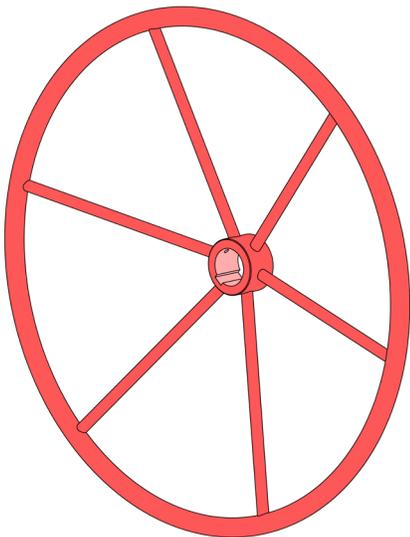


SINGLE STAGE WORM GEAR

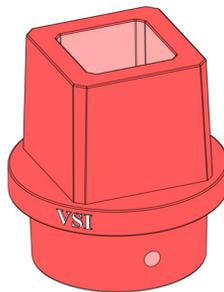


Single stage worm gear or worm gear
with spur secondary gear

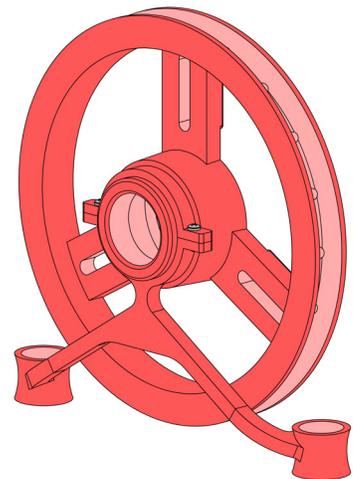
HANDWHEEL



2-INCH NUT OP.

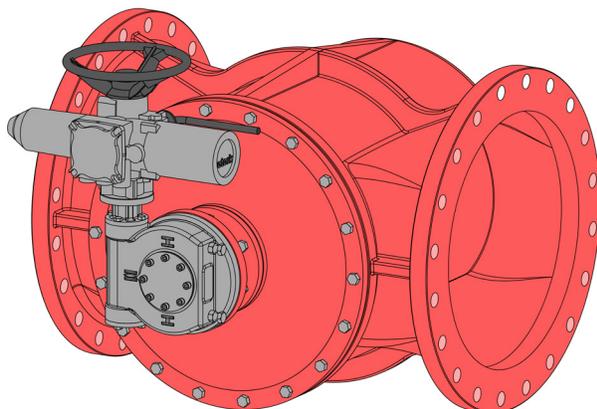


CHAINWHEEL

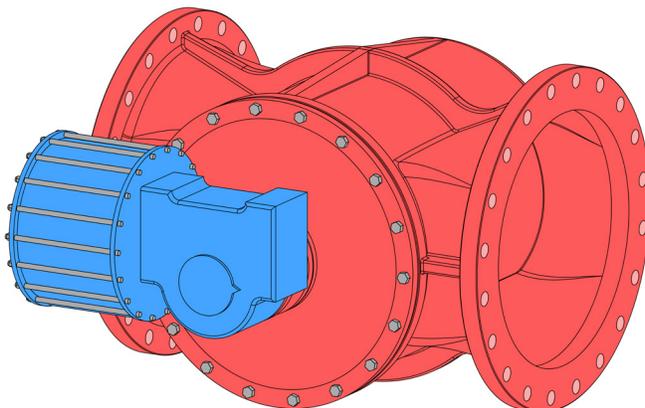


SPECIAL CONFIGURATIONS

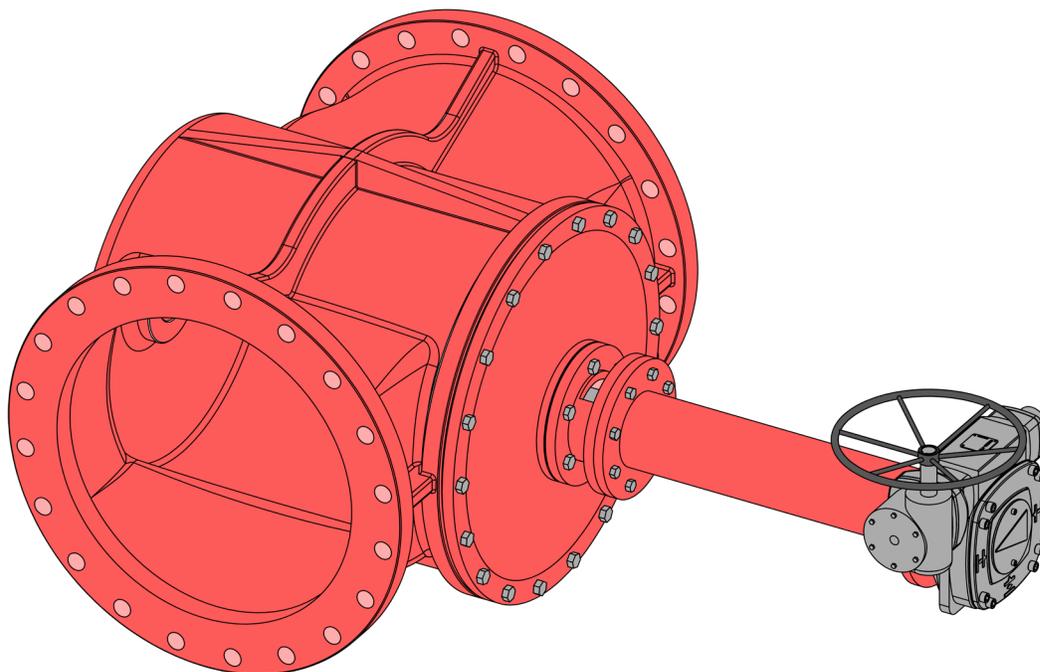
ELECTRIC ACTUATORS



PNEUMATIC/HYDRAULIC ACTUATORS

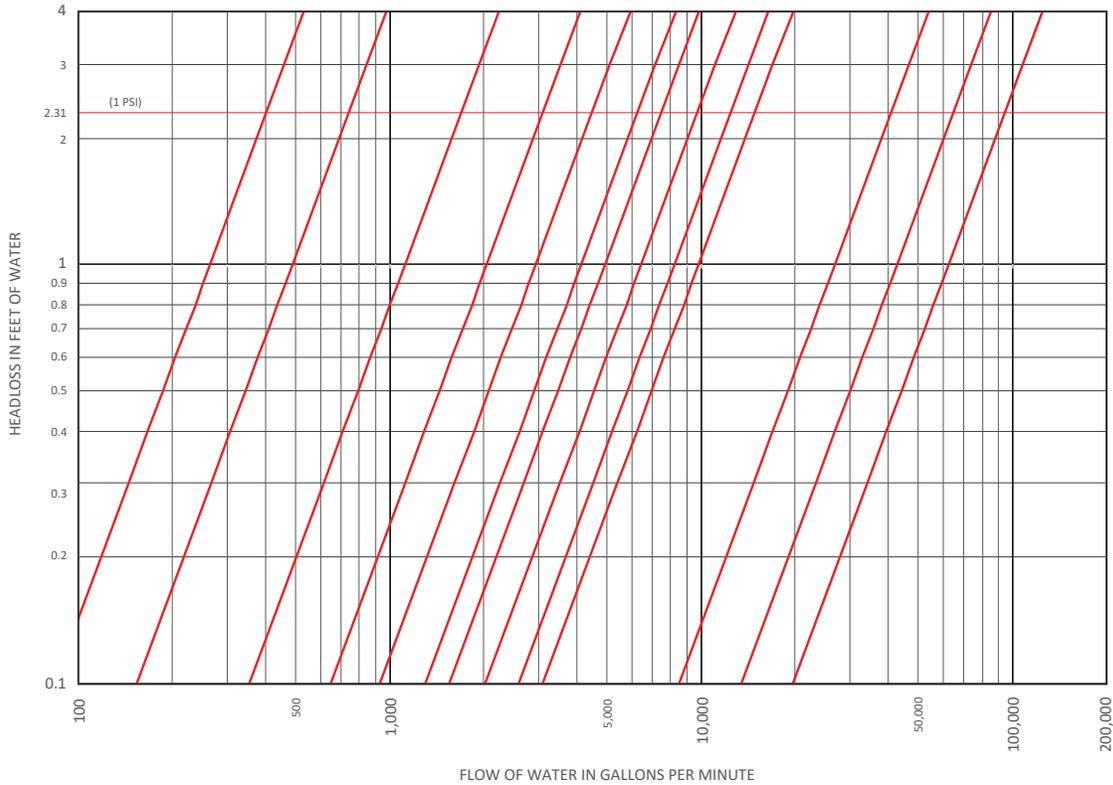


BONNET EXTENSIONS



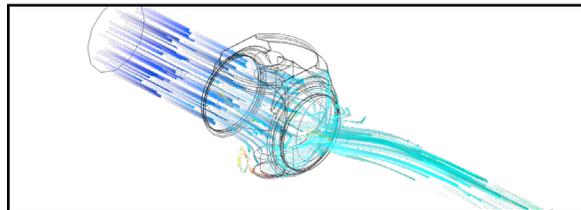


FLOW CHARACTERISTICS



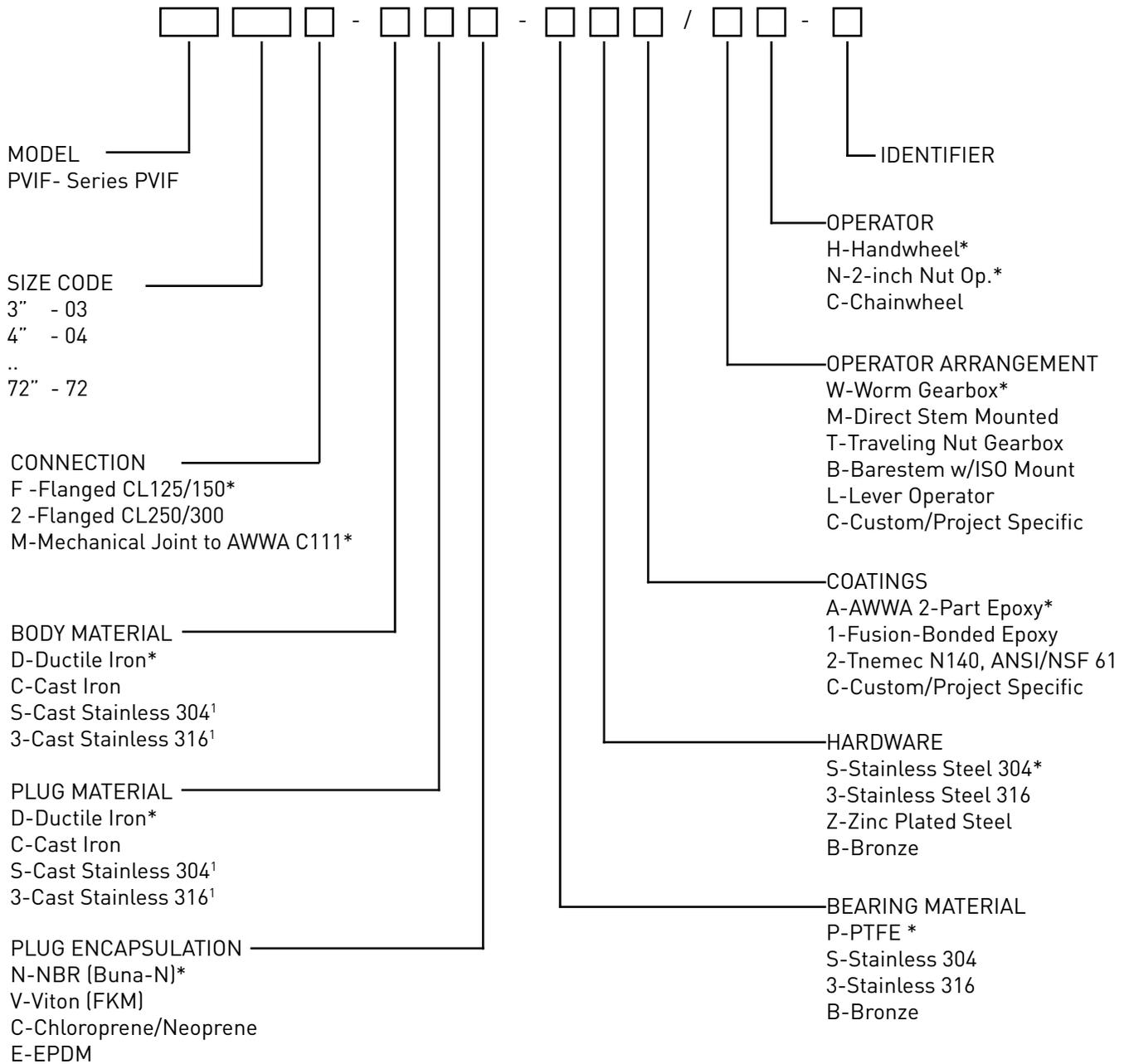
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SIZE	Cv	Kv
3"	404	348
4"	743	640
6"	1710	1474
8"	3100	2672
10"	4500	3879
12"	6300	5431
14"	7500	6465
16"	9800	8448
18"	12500	10775
20"	15000	12930
24"	41000	35342
30"	65000	56030
36"	95000	81890





PART NUMBER MATRIX



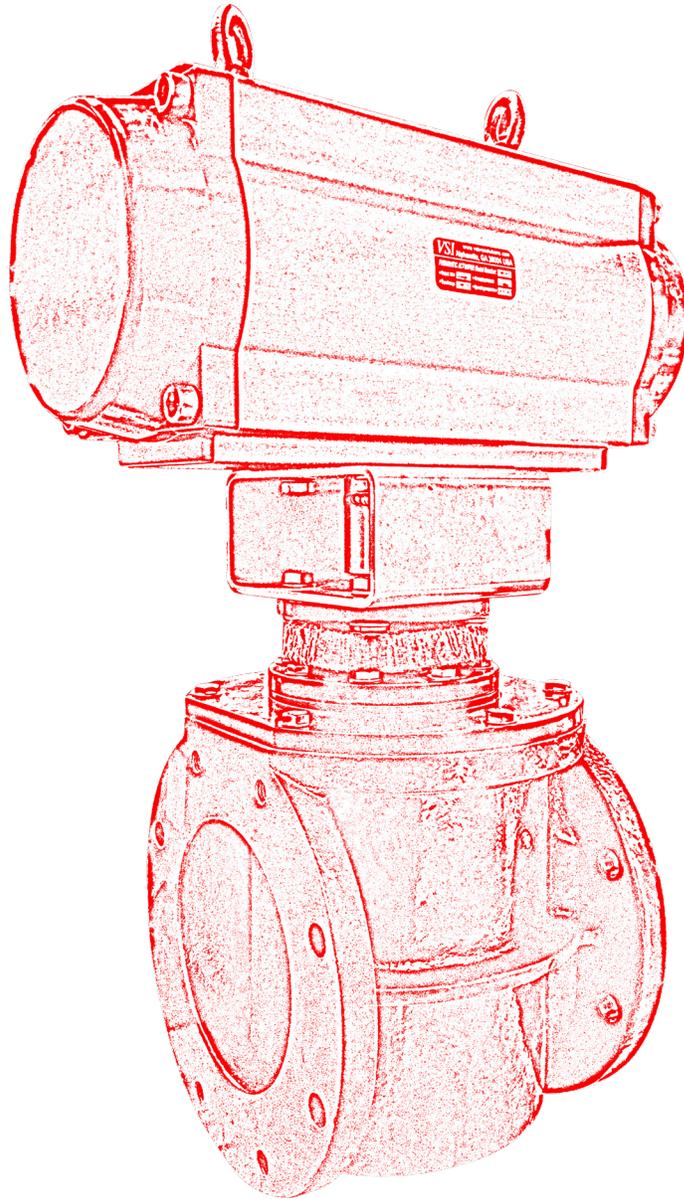
* Standard Material

1 - May not be available for all configurations/sizes

EXAMPLE:

PVIF14F-DDN-PSA/WC-W

A 14" flanged rectangular full port plug valve with Ductile Iron body and plug, NBR plug encapsulation, reinforced PTFE bearings, SS304 hardware, black 2-part epoxy coating, worm gearbox with chainwheel operator.



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As part of a process of on-going product development, VSI reserves the right to amend or change specifications without prior notice. Published data may be subject to change. For the latest version, visit our website at www.vsiwaterworks.com